

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A motor drive apparatus comprising:

a permanent magnet motor; and

a controller that:

~~estimation means estimating~~ estimates an amount of demagnetization of ~~a the~~ permanent magnet motor based on a voltage control amount of ~~the a~~ q axis applied under control of in a case where said the permanent magnet motor is ~~controlled~~ using a d-q axis transformation; and

~~operation handling means limiting limits~~ an output of ~~said the~~ permanent magnet motor when ~~said the~~ estimated amount of demagnetization is larger than a predetermined value, wherein

the controller (i) obtains a reference value that is the voltage control amount of the q axis in a case where the permanent magnet motor is not demagnetized, according to a current and a motor revolution number of the permanent magnet motor being controlled, and (ii) estimates the amount of demagnetization based on a comparison between the reference value and an actual value under the control of the voltage control amount of the q axis.

2. (Currently Amended) The motor drive apparatus according to claim 1, further comprising:

a converter changing an input voltage necessary for driving ~~said the~~ permanent magnet motor, wherein the controller corrects the estimated amount of demagnetization according to a level of the input voltage

~~said estimation means corrects said estimated amount of demagnetization according to the level of said input voltage.~~

3. (Currently Amended) The motor drive apparatus according to claim 1, wherein the controller estimates the amount of demagnetization based on which one of the reference value and the actual value under the control of the voltage control amount of the q axis is larger.

~~said estimation means estimates said amount of demagnetization by comparing the voltage control amount of the q axis to be controlled with a reference value.~~

4. (Currently Amended) The motor drive apparatus according to claim 3, wherein the controller holds a map that is configured based on a relationship between the voltage control amount of the q axis and a combination of current command values of the d and q axes and the motor revolution number that are preliminarily measured in a case where the permanent magnet motor is not demagnetized, and

the controller obtains the reference value from the map based on present values of the current command values of the d and q axes and a present value of the motor revolution number.

~~said estimation means holds, in the form of a map (MAP), the reference values correlated with at least two revolution numbers to extract said reference value from said map (MAP) and estimate said amount of demagnetization.~~

5. (Currently Amended) The motor drive apparatus according to ~~claim 1,~~claim 3, wherein the controller holds a map that is configured based on a relationship between the voltage control amount of the q axis and a combination of measured current values of the d and q axes and the motor revolution number that are preliminarily measured in a case where the permanent magnet motor is not demagnetized, and

the controller obtains the reference value from the map based on present values of the measured current values of the d and q axes and a present value of the motor revolution number.

~~said estimation means estimates said amount of demagnetization based on a difference between a reference value and the voltage control amount of the q axis to be controlled.~~

6. (Currently Amended) The motor drive apparatus according to ~~claim 5,~~claim 1, wherein the controller said estimation means holds, in the form of a map (MAP), the reference values correlated with at least two revolution numbers to extract said reference value from said map (MAP) and estimate said estimates the amount of demagnetization based on a difference between the reference value and the actual value under the control of the voltage control amount of the q axis.

7. (Currently Amended) The motor drive apparatus according to ~~claim 3,~~claim 6, wherein the controller holds a map that is configured based on a relationship between the voltage control amount of the q axis and a combination of current command values of the d and q axes and the motor revolution number that are preliminarily measured in a case where the permanent magnet motor is not demagnetized, and
the controller obtains the reference value from the map based on present values of the current command values of the d and q axes and a present value of the motor revolution number.

~~said reference value is said voltage control amount of the q axis when no demagnetization of said permanent magnet motor occurs.~~

8. (Currently Amended) The motor drive apparatus according to ~~claim 4,~~claim 6, wherein the controller holds a map that is configured based on a relationship between the voltage control amount of the q axis and a combination of measured current values of the d and q axes and the motor revolution number that are preliminarily measured in a case where the permanent magnet motor is not demagnetized, and

the controller obtains the reference value from the map based on present values of the measured current values of the d and q axes and a present value of the motor revolution number.

~~said reference value is said voltage control amount of the q axis when no demagnetization of said permanent magnet motor occurs.~~

9. (Currently Amended) The motor drive apparatus according to ~~claim 5,~~claim 1, further comprising an inverter, wherein the voltage control amount is corrected by adjusting dead time of transistors in the inverter when voltage applied to the inverter changes.

~~said reference value is said voltage control amount of the q axis when no demagnetization of said permanent magnet motor occurs.~~

10. (Currently Amended) The motor drive apparatus according to ~~claim 6,~~claim 1, further comprising an inverter, wherein the voltage control amount is corrected by adjusting dead time in measuring the voltage control amount when voltage applied to the inverter changes.

~~said reference value is said voltage control amount of the q axis when no demagnetization of said permanent magnet motor occurs.~~